

PROTOCOL USED FOR BC-2088 RS-232 COMMUNICATION

The protocol used for communication between the PC and the BC-2088 switcher is defined as follows:

N7	N6	N5	N4	N3	N2	N1	N0
MSB							LSB

The data is sent at a baud rate defined by the SYS setting on the 2088 (1200 baud, 9600 baud - default, or 19200 baud), with no parity and one stop bit.

N7 = 1 means that an opcode is being sent to the 2088. If N7 = 0 then an instruction to change the input to output setting follows. Also when the 2088 responds to a request to download some parameter (opcode 1, 2 or 3), then the downloading is done with N7 = 1.

FOR N7 = 0 :-

N6 is defined as the video / audio bit. It is high if the information being sent refers to the video setting, and low if it refers to the audio setting. For a non-breakaway setup, this bit is ignored and the information is relevant to both the video and the audio.

N5N4N3 refers to the output to which the connection is made (when sending from the 2088), or the output to which the connection is to be made (when sending to the 2088). The machine's output is defined as 1+N5N4N3, eg. when addressing the machine's output 4, then N5N4N3 = 011; when addressing machine output 1, N5N4N3 = 000; and when addressing machine output 8, N5N4N3 = 111.

N2N1N0 refers to the input which is to be switched. Similar to the definition for the output, the machine's input is defined as 1+N2N1N0.

EXAMPLES :-

- 0011 0001 - connect audio input 2 to output 7
- 0111 0001 - connect video input 2 to output 7
- 0000 0011 - connect audio input 4 to output 1
- 0011 1000 - connect audio input 1 to output 8

Note that if a connection is made via the 2088 keyboard, then the code as described above is sent from the 2088 via the RS-232 port. If we want to instruct the 2088 (via the RS-232 port) to make a connection, then we send the code described above, ie. the same format is used in both directions.

FOR N7 = 1 :-

N2N1N0 = 000 - (opcode=0; PC to 2088 / 2088 to PC)

Disconnect an output. The machine output to be disconnected is defined as 1+N5N4N3, as before. N6 is not defined.

EXAMPLES :-

- 1000 0000 - disconnect video and audio output 1
- 1010 1000 - disconnect video and audio output 6
- 1011 1000 - disconnect video and audio output 8

N2N1N0 = 001 - (opcode=1; PC to 2088 only; requires response from 2088)

Download the status of output # N5N4N3. Similar to the definition for the output above, the machine's output is defined as 1+N5N4N3. Also, N6 is defined as the video / audio bit - high if the status of the video output is required.

EXAMPLES :-

- 1100 0001 - download video output 1
- 1110 1001 - download video output 6
- 1010 1001 - download audio output 6
- 1011 1001 - download audio output 8

The response of the 2088 to opcode 1 is N7=1; N2N1N0 equal to the machine input connected to the output which is to be downloaded, and N4 a flag which is high if this output has been disconnected. For example, if input 3 is connected to output 6 (video), then the response to request 1110 1001 (download video output 6) will be 1000 0011; if output 6 was disconnected, the response would be 1001 0000.

N2N1N0 = 010 - (opcode=2; PC to 2088 only; requires response from 2088) Download the machine type. The values of N6, N5, N4 and N3 are irrelevant. The response of the 2088 to opcode 2 is defined as follows:-

N7 = 1
N6 = 1 for breakaway
N5N4 = 00 for CV (composite video) setting
N5N4 = 01 for Y/C (sVHS) setting
N5N4 = 10 for RGBS / YUV setting

For example, the response to 1000 0010 for a CV, breakaway machine would be 1100 0000. The response for a RGBS, non-breakaway machine would be 1010 0000.

N2N1N0 = 011 - (opcode=3; PC to 2088 only; requires response from 2088)

Download the setup saved in address # N6N5N4N3.

(To download the present setup, set the address = 0). The 2088 responds by sending 10 bytes of information defined as follows, (where the machine input = input + 1, eg. input 0 = machine input 1) :-

1st byte - the machine type as described above for opcode 2

2nd byte - N7 = 1;

N5N4N3 = video input connected to machine output 2;

N2N1N0 = video input connected to machine output 1

3rd byte - N7 = 1;

N5N4N3 = video input connected to machine output 4;

N2N1N0 = video input connected to machine output 3

4th byte - N7 = 1;

N5N4N3 = video input connected to machine output 6;

N2N1N0 = video input connected to machine output 5

5th byte - N7 = 1;

N6 = 1 for setup not defined (no data saved);

N5N4N3 = video input connected to machine output 8;

N2N1N0 = video input connected to machine output 7

6th byte - N7 = 1;

N5N4N3 = audio input connected to machine output 2;

N2N1N0 = audio input connected to machine output 1

7th byte - N7 = 1;

N5N4N3 = audio input connected to machine output 4;

N2N1N0 = audio input connected to machine output 3

8th byte - N7 = 1;

N5N4N3 = audio input connected to machine output 6;

N2N1N0 = audio input connected to machine output 5

9th byte - N7 = 1;

N5N4N3 = audio input connected to machine output 8;

N2N1N0 = audio input connected to machine output 7

10th byte - N7 = Flag indicating that output 8 is disconnected;

N6 = Flag indicating that output 7 is disconnected;

N5 = Flag indicating that output 6 is disconnected;

N4 = Flag indicating that output 5 is disconnected;

N3 = Flag indicating that output 4 is disconnected;

N2 = Flag indicating that output 3 is disconnected;

N1 = Flag indicating that output 2 is disconnected;

N0 = Flag indicating that output 1 is disconnected;

EXAMPLE :- For a machine with the following data saved in

memory #9 :-

breakaway, CV setup;
video machine input 1 to machine output 1;
video machine input 2 to machine output 2;
video machine input 3 to machine output 3;
:
:
video machine input 8 to machine output 8;
audio machine input 1 to machine output 8;
audio machine input 2 to machine output 7;
audio machine input 3 to machine output 6;
:
:
audio input 8 to output 1;

the response to 1100 1011 would be (an X indicates a "don't care" condition):-

1100 0000 (1st byte)
1X00 1000 (2nd byte)
1X01 1010 (3rd byte)
1X10 1100 (4th byte)
1011 1110 (5th byte)
1X11 0111 (6th byte)
1X10 0101 (7th byte)
1X01 0011 (8th byte)
1X00 0001 (9th byte)
0000 0000 (10th byte)

N2N1N0 = 100 - (opcode=4; PC to 2088 / 2088 to PC) Save (store) the present setup in address # N6N5N4N3. If sending to the 2088, the 2088 should respond with the success code (opcode 7). For example, the code 1110 1100 sent from the 2088 means that the present setup has been saved in address 13.

N2N1N0 = 101 - (opcode=5; PC to 2088 / 2088 to PC) Setup machine type. The setup is as defined as for opcode 2. If sending to the 2088, the 2088 should respond with the success code (opcode 7).

N2N1N0 = 110 - (opcode=6; PC to 2088 / 2088 to PC) Recall the setup saved in address # N6N5N4N3. If sending to the 2088, the 2088 should respond with the success code (opcode 7). For example, the code 1010 1110 sent from the 2088 means that setup 5 has been recalled.

N2N1N0 = 111 - (opcode=7; 2088 to PC only) Success code. If N3 = 1 then success. N6, N5 and N4 are irrelevant.

N7N6N5N4N3N2N1N0 = 1111 1111 - When the 2088 is initialized, ie when it is turned on, the machine sends this byte of information.

Swich Matrix Coding for the 2088

	Output #1	Output #2	Output #3	Output #4	Output #5	Output #6	Output #7	Output #8
Input #1	40 H	48 H	50 H	58 H	60 H	68 H	70 H	78 H
Input #2	41 H	49 H	51 H	59 H	61 H	69 H	71 H	79 H
Input #3	42 H	4A H	52 H	5A H	62 H	6A H	72 H	7A H
Input #4	43 H	4B H	53 H	5B H	63 H	6B H	73 H	7B H
Input #5	44 H	4C H	54 H	5C H	64 H	6C H	74 H	7C H
Input #6	45 H	4D H	55 H	5D H	65 H	6D H	75 H	7D H
Input #7	46 H	4E H	56 H	5E H	66 H	6E H	76 H	7E H
Input #8	47 H	4F H	57 H	5F H	67 H	6F H	77 H	7F H
OFF	80 H	88 H	90 H	98 H	A0 H	A8 H	B0 H	B8 H